

## 7-4: Permutations

**Warm-up:** At least twelve permutations of the letters AEPRS are legal words in the game of Scrabble (or on Scrabulous on Facebook). In fact, no other set of five letters forms as many legal Scrabble (or Scrabulous) words at these five letters.

1. Name as many of the twelve as you can.
2. If the letters AEPRS are ordered at random, what is the probability that the ordering forms a legal word?

*Permutation:*

*Permutation Theorem:*

*Example 1:* In a 4-person relay race, the fastest runner typically is the last person (anchor) to run for the relay team. If that place is set, how many different orders are there for the other runners?

*Formula for Permutations:*

*Example 2:* How many different four-letter “words” can be formed from the letters in the word EQUATIONS? In this case, “words” are just four-letter arrangements.

*Zero Factorial:*

*Example 3:* Solve  ${}_xP_{10} = 20({}_xP_8)$ .

Homework:

**I'm a great believer in luck, and I find the harder I work the more I have of it. -  
Thomas Jefferson**